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Weekly Bulletin

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Garbage Disposal.

Garbage and refuse is one of the most perplexing problems that confronts the average health officer. Because of the need for full information upon this subject the following article by Mr. S. A. Greely, Consulting Sanitary Engineer of Chicago, printed in the *Michigan Public Health* is reproduced, in part, in this issue of the BULLETIN.

By SAMUEL A. GREELEY, S.B., Consulting Sanitary Engineer, Chicago, Ill.

I have been asked to talk on the subject of garbage disposal. This is perhaps one of the phases of sanitary engineering work less closely related to the public health and in which less progress may perhaps be recorded than in the fields of water supply and sewage treatment. Refuse disposal as a science was little known fifty years ago. In this country it was first started on the way to a scientific basis by Rudolph Hering through his work for the American Public Health Association in 1887. That was about thirty-five years ago. One of the first garbage incinerators in America was built for the United States Government on Governor's Island in New York Harbor in 1885. The Merz System of garbage reduction for the manufacture of grease and fertilizer was introduced into America at Buffalo in 1886.

Since the installation of these two plants, many different methods of incineration and reduction have been developed. Some of these have been successful and others unsuccessful, depending, in my judgment, in considerable measure upon the rationality of the design from an engineering standpoint and the soundness with which the works were built, plus the ever important aspect of efficient operation.

Many years, however, before the introduction of these special processes, garbage was buried in the soil or fed to hogs. Even now, these methods of disposal offer a satisfactory method although they are frequently abused in spite of their long use.

To give a description of the present status of garbage disposal I am going to outline briefly an investigation which we are just now making into the garbage and refuse disposal problem of New Trier Township immediately adjacent to the city of Chicago on the north.

General Definitions.

It seems hardly necessary to give much space to a definition of terms. By house refuse, I mean garbage, ashes and rubbish. Refuse is a comprehensive term including mixtures of its various classes. Garbage although relatively small in quantity is the most readily decomposed and therefore, more likely to create nuisance as well as to harbor flies, rats, and vermin. Ashes are by far the largest in quantity but are relatively inert. Rubbish comprising old papers, boxes, barrels and the like is the most bulky and unsightly.

What Can the Health Officer Do?

I hesitate to make much comment under this heading, as I am not a health officer. I have often felt that remote control by the health officer is likely to be more effective than direct manage-

ment. If the collection and disposal of refuse is handled by a strict Department or Department of Public Works, the health officer is in a position to make frequent inspections and to give his influence to maintaining a high standard of service.

I believe that a health officer can go further than this in the development of a satisfactory system of garbage disposal. Much common sense and a realization of relative values is needed in the garbage disposal field today. Many processes and methods of disposal are under promotion by skillful salesmen. I know of several communities in which relatively expensive garbage disposal plants have been built and never operated. A sound understanding of the relative value as regards public health and convenience of collection on the one hand and disposal on the other is very much needed. The collection of garbage not only costs more in general than its disposal, but it also affects more people more directly than the disposal and coupled with the disposal of rubbish and the maintenance of dumps, has a marked effect on the cleanliness of a community. If the health officer could fully comprehend the fundamental aspects of refuse collection and disposal and guide the solution into rational lines, much would be accomplished in the efficiency and economy of the service. Fifteen years ago or so, water filtration plants were sold by manufacturers. An approach toward quantity production limited the development of good delivery. Therefore, many water filtration plants have been built with very poor design of pipe galleries and other details. Since competent design has been secured through experienced engineers, better filtration plants have been built. A somewhat similar analogy holds in the garbage disposal field.

Brief Statement of Methods.

Before proceeding with a description of the New Trier Township survey, I want to briefly mention some of the available methods of garbage disposal.

(a) Garbage can be disposed of by shallow burial. Modifications of this are plowing into the soil, land fill with the addition of relatively clean inert materials and dumping into large bodies of water.

(b) The food value of fresh garbage is sufficiently great to have made feeding to hogs an old and very common method of final disposal. During the war the use of this method was greatly extended.

(c) European practice has largely developed to the burning of refuse in specially designed furnaces with or without an additional fuel. This may be a sanitary but relatively expensive method.

(d) The reduction method of garbage disposal consists in causing the garbage to be separated into four parts—water, grease, tankage and volatile matter. This method is more applicable to larger than to smaller cities.

(e) A recent method introduced from Italy is the so-called Beccari method in which the garbage is allowed to ferment in specially designed masonry chambers for a period of several months, at the end of which time it has a fertilizer value.

There are, of course, other special methods and under the general term, methods for collection should also be included, as for instance by horse-drawn vehicles, motor trucks or by the tractor trailer system.

New Trier Township Survey.

We are just completing an investigation of this problem for New Trier Township in Illinois which includes four incorporated towns with a present population of about 26,000. The Township comprises almost entirely residential districts. It extends some six miles along Lake Michigan on the east and inland three to four miles. The bulk of the population lies in the area within a mile and a half of Lake Michigan, but rapid growth is pushing the population to the west.

An old marsh a mile or so wide extends along the entire western margin. This is gradually being drained or filled and made habitable.

At the present time the collection and disposal of garbage and other refuse is done on a more or less informal basis. The collection is partly by contract and partly by hired trucks under village operation. The garbage is taken to the west and either plowed into the soil or fed to hogs. This has been inexpensive, but has given trouble through uncertainty as to operation and the creation of nuisance.

Ashes have been dumped along new roads and in available low areas. This has been quite satisfactory, but the space is limited and will be exhausted in about two years. It is estimated that the production of ashes amounts to about 20,000 tons per year of 34,000 cubic yards, which would cover four acres five feet deep.

Garbage on the other hand amounts to about 4,000 tons per year or 8,000 cubic yards. The production is quite low in winter and very high in summer. This amount of garbage at the rate of 40 pounds to yield one pound of pork would produce 200,000 pounds of pork per year.

Rubbish has been dumped much to the displeasure of the local improvement associations. It has disfigured parts of otherwise attractive districts.

The cost of collecting and disposing of this house refuse amounts to about $78,000 per year or about $3 per capita of the total population. If every house in the township were given service, the cost would increase to upwards of $4 per capita.

The contracts for garbage disposal have been let from year to year and the places of disposal have had to shift with the encroaching population. This uncertainty coupled with the anticipated shortage of dumps led to the present investigation.

At the present time I am not at liberty to report any specific conclusions, but a number of relative conclusions may be of interest.

For garbage disposal, we considered incineration, burial, hog feeding and the Beccari process. We first computed the cost per ton for disposal at a single plant, two plants, and three plants, including in each case the estimated cost for hauling or transportation. The single plant proved to be the least costly, with two plants more favorable than three. The reason for this was apparently because the motor permits of relatively long hauls on good roads at high speeds with little difference in the cost as between a single plant and three plants.

As between the various methods of garbage disposal for a single plant, the following computations resulted:

Method.	Net Cost per Ton.
Incineration ----------	$3.10
Burial ----------	1.94
Hog Feeding --------	0.76 profit.
Beccari Process------	0.35

Obviously, incineration is quite expensive. Hog feeding may not be permissible in the district under consideration, although the estimates included all practical methods for eliminating nuisance. Burial in conjunction with ash disposal in the swampy area along the west margin of the District offers possibilities, particularly if the value of reclaimed land should be included.

In this community are many lawns, gardens, country clubs, and the like. Therefore it is likely that the fertilizer produced in the Becarri process will have a steady market. This process, therefore, has an interesting application to this particular community.

In the disposal of ashes, the cost of haul is relatively more important. The cost of disposal by dumping was estimated at 48 cents per ton. A worthwhile consideration for ash disposal would be the purchasing of waste land and reclaiming it by fill, thus securing a return by the increased value. This, of course, would have to be done under careful management and accounting.

For rubbish, it seems essential to make some disposition that will not disfigure the community. The least expensive is dumping. Under proper operation the readily salable portions of the rubbish would be picked out. The bulky, easily combustible portions would be burned in a brick pit. Tins would be bailed. The residual rubbish and bailed tins would be dumped and buried with the ashes. A more expensive rubbish disposal would be complete sorting in a building for shipment out of the district with high temperature incineration of the residual.

As regards collection, we believe for this district motorized equipment would be best because it is cleaner on the streets than horse-drawn vehicles. We are making careful studies of the best size and kind of equipment for the proposed service. Present indications indicate a close decision as between light inexpensive trucks and heavy, more or less expensive trucks of large capacity.

There remains now to relate the somewhat general studies to available sites and local operations so that a workable scheme can be perfected. It is quite likely that the disposal will be planned for a progressive development.

The various combinations and alternatives which require consideration in working out a refuse disposal project are apparent from the foregoing description. We have prepared a chart to illustrate the various relationships. There are four principal elements to deal with and three to be satisfied, including householders, the public and the economy of operation. Between these four elements, namely, house treatment, collection, haul and final disposal, and the three elements to be satisfied there appear to be 19 different relationships. Thus, collection is not only influenced by the house treatment and haul, but also by items of cost in operation, public considerations, methods of final disposal and the like.

Like all engineering problems, the refuse disposal problem is one which can not be reduced to mathematical calculation, but must be solved on a basis of experience by those who have had opportunity to study and correlate this experience in a broad manner.

Health is certainly more valuable than money; because it is by health that money is procured.—Johnson.

MORBIDITY.*

Diphtheria.

126 cases of diphtheria have been reported, as follows: Los Angeles 41, San Francisco 19, Oakland 14, Los Angeles County 8, Sacramento 7, Gridley 5, San Jose 3, Concord 2, Berkeley 3, Palo Alto 1, Ontario 1, Manteca 2, Tracy 2, Lodi 2, Turlock 1, San Bernardino County 2, Santa Clara County 3, Monrovia 1, Manhattan 1, Whittier 2, San Diego 4, Santa Cruz County 1, Long Beach 1.

Measles.

39 cases of measles have been reported, as follows: Los Angeles 12, Los Angeles County 4, South Pasadena 2, Sacramento 1, Banning 1, Oakland 1, Santa Clara County 1, Siskiyou County 3, Pasadena 1, San Francisco 2, Fullerton 2, Colton 1, Santa Cruz 1, Long Beach 1, Palo Alto 1, Berkeley 1, San Joaquin County 1, San Bernardino County 1, San Diego 2.

Scarlet Fever.

46 cases of scarlet fever have been reported, as follows: Los Angeles 12, Los Angeles County 5, San Francisco 6, Alameda County 1, Oakland 2, Ontario 2, Orange County 3, Stockton 1, Sacramento 1, Paso Robles 1, San Diego 2, Fresno County 1, San Bernardino County 2, Kingsburg 1, Butte County 1, Santa Clara County 1, Redlands 1, Santa Barbara 3.

Smallpox.

60 cases of smallpox have been reported, as follows: Los Angeles 32, Long Beach 6, Los Angeles County 11, Oakland 1, Santa Ana 1, Orange County 2, Orange 1, San Diego 1, Huntington Park 2, San Bernardino County 1, Tulare County 1, Colton 1.

Typhoid Fever.

22 cases of typhoid fever have been reported, as follows: San Francisco 2, Benicia 2, Los Angeles 1, Oakland 2, Banning 1, Pasadena 1, Ventura County 2, Lodi 1, Sacramento County 2, Fresno County 3, Tulare County 1, Los Angeles County 2, Sonoma County 1, California 1.

Whooping Cough.

78 cases of whooping cough have been reported, as follows: Los Angeles 24, Alameda 7, Palo Alto 6, Manteca 5, Los Angeles County 10, Ontario 1, Orange County 4, Tulare County 1, Long Beach 3, Pasadena 4, Red Bluff 1, Torrance 1, Fresno County 2, Stockton 1, San Joaquin County 2, El Monte 1, Orange 1, Santa Monica 1, San Francisco 1, Oakland 2.

Cerebrospinal Meningitis.

2 cases of cerebrospinal meningitis have been reported, as follows: Los Angeles 1, San Francisco 1.

Leprosy.

4 cases of leprosy have been reported, as follows: Los Angeles 3, San Fernando 1.

Epidemic Encephalitis.

3 cases of epidemic encephalitis have been reported, as follows: Oakland 1, San Francisco 1, Fresno County 1.

Botulism.

1 case of botulism has been reported from Los Angeles.

*From reports received on August 4 and 5 for week ending August 2.

COMMUNICABLE DISEASE REPORTS.

Diseases	1924				1923			
	Week ending			Reports for week ending Aug. 2 received by Aug. 5	Week ending			Reports for week ending Aug. 4 received by Aug. 7
	July 12	July 19	July 26		July 14	July 21	July 28	
Anthrax	0	0	0	0	0	0	1	0
Botulism	0	0	5	1	0	0	0	0
Cerebrospinal Meningitis	2	3	1	2	3	6	0	1
Chickenpox	84	88	45	27	112	51	43	37
Diphtheria	159	180	165	126	111	130	129	90
Dysentery (Bacillary)	0	0	0	0	0	12	0	1
Epidemic Encephalitis	1	1	0	3	2	4	3	4
Epidemic Jaundice	0	0	0	0	0	0	0	0
Gonorrhoea	96	40	75	62	149	92	83	83
Influenza	3	4	4	4	10	8	14	2
Leprosy	1	1	0	4	0	0	0	0
Malaria	1	1	1	1	7	4	8	2
Measles	127	49	54	39	420	348	238	163
Mumps	25	13	29	8	10	10	10	9
Pneumonia (Lobar)	13	28	22	16	23	25	96	25
Poliomyelitis	1	3	2	0	0	5	1	4
Rabies (human)	0	0	0	0	0	0	0	0
Scarlet Fever	58	69	48	46	66	94	70	56
Smallpox	102	80	85	60	36	41	34	34
Syphilis	150	62	135	81	113	129	103	167
Tuberculosis	156	240	116	177	165	146	120	147
Typhoid Fever	37	39	35	22	15	24	23	29
Typhus Fever	0	0	0	0	0	0	0	0
Whooping Cough	69	66	59	78	73	106	78	62
Totals	1085	966	881	757	1315	1235	1054	916

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